

Application of Human Behavior Patterns on Residential Floors (Case Study: The Jarrdin Apartment, Bandung)**Phoebe Edrica, Hartanto Budi Yuwono**

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Keywords	Abstract
The Jarrdin Apartment, Comfort, Human Behavior, Floor Height	Changes in urban lifestyles demand vertical housing solutions such as apartments. The Jarrdin Apartment in Bandung City is one example of vertical housing that accommodates thousands of residents within limited space and with significant height differences. This study aims to examine the impact of floor height on residents' physical and psychological comfort, as well as to propose alternative design approaches for human behavioral patterns in vertical spaces. The method used is descriptive qualitative, involving field observations, resident interviews, and literature studies. The results show that floor height influences perceptions of comfort, accessibility, and social interaction, ultimately shaping unique behavioral patterns at each residential level. Alternative design strategies that consider circulation access, natural lighting, social interaction spaces, and perceived safety are crucial for creating more humane vertical dwellings. Based on these findings, the study recommends three concrete design solutions: increasing the ceiling height to at least 2.4-2.5 meters, adding multi-storey social interaction spaces, and optimizing openings for natural lighting and ventilation. The implications of this study not only provide practical guidance for vertical housing developers, but also encourage the need for a revision of apartment design standards in Indonesia that take into account the psychological well-being of residents, while offering a new framework for designing humane and sustainable vertical housing.

**INTRODUCTION**

An effective residential space design must consider not only functionality and aesthetics but also the comfort of the occupants in every aspect (Altomonte & Schiavon, 2013; Gharib et al., 2012). In the context of vertical housing such as apartments, resident comfort is greatly influenced by various factors, one of which is the floor-to-ceiling height of the unit (Kim & Kim, 2010). Low ceiling height is one of the main challenges in apartment design, commonly found in vertical buildings in major cities (Wang & Bullen, 2016). Insufficient height may cause feelings of claustrophobia and discomfort, which affect psychological well-being and spatial perception (Zhao et al., 2022). This is evident in The Jarrdin Apartment in Bandung, which features units with a floor-to-ceiling height of only 2 meters—significantly below the

comfort standards suggested by architectural and housing studies (Astuti et al., 2021; Nugroho & Purwanto, 2020).

Low ceiling height can affect many aspects of occupant comfort. First, in terms of natural lighting, a low ceiling restricts the entry of sunlight into the unit, which in turn affects the quality of natural lighting inside the room (Al Horr et al., 2016). A lack of daylight can make the space feel darker, damper, and less healthy (Edwards & Torcellini, 2002). Inadequate natural light has been linked to adverse psychological effects, including increased levels of stress and decreased well-being (Boubekri et al., 2014). Moreover, studies show that limited exposure to daylight can lead to circadian rhythm disruption, resulting in sleep disturbances and lower productivity (Figueiro & Rea, 2016). Poor lighting quality due to ceiling constraints can also increase dependency on artificial lighting, thereby affecting energy efficiency and indoor environmental quality (Ghani et al., 2021; Küller & Lindsten, 1992).

Furthermore, air circulation becomes another major issue. A limited ceiling height reduces the air volume within the unit and hampers airflow, which can degrade indoor air quality. This can make the air inside feel stuffy, increase humidity, and lower the overall quality of life—especially for occupants who are sensitive to air conditions, such as asthma or allergy sufferers (Tham, 2016).

A sense of confinement is also a significant issue resulting from low ceilings. Occupants often experience limited vertical space, reducing their freedom of movement and making the space feel cramped and uncomfortable. This physical and psychological discomfort ultimately leads to a decline in overall quality of life.

Beyond physical aspects, low ceiling height also affects behavioral patterns of residents in terms of social interaction and space use. For instance, occupants may avoid using their unit's interior spaces and prefer to spend time outside or in public areas. This can reduce social interaction among residents and create a feeling of isolation. Cramped spaces can discourage social activities such as receiving guests, spending time with family, or even relaxing comfortably.

Another issue that arises is the impact on daily activities. Occupants who feel uncomfortable in their apartment unit may be less likely to invite guests or participate in community events. This leads to a reduced sense of belonging and lower engagement within the apartment community. Moreover, residents may also avoid using some of the apartment's facilities, such as lounges or communal areas, which should ideally be spaces for social interaction.

Low ceiling height also affects the furniture layout and interior elements within the unit. Good interior design requires sufficient vertical space for effective furniture arrangement. With a low ceiling, residents may feel limited in organizing their space optimally. This limitation may reduce space efficiency and affect the occupant's comfort in carrying out daily activities at home.

Overall, the low floor-to-ceiling height in The Jarrrdin Apartment in Bandung significantly affects residents' behavioral patterns, from physical comfort to social interaction. The lack of adequate vertical space reduces the quality of life—physically, emotionally, and socially. Therefore, there is a need for evaluation and alternative design strategies, such as

increasing floor height, to create a more comfortable, healthy, and socially supportive living environment within the apartment.

It is important to remember that optimal residential design not only meets physical needs but also considers the psychological well-being of its occupants. Therefore, redesigning the spatial elements in The Jarrrdin Apartment can be a solution to improve the quality of life of its residents and to create a more humane and functional living space.

Designing an effective residential space not only needs to consider functional and aesthetic aspects, but also the comfort of residents in all respects. In the context of vertical housing such as apartments, occupant comfort is greatly influenced by various factors, one of which is the ceiling height of the unit. Previous research such as Akmal (2007) examined apartment design principles, but focused more on space efficiency without exploring the psychological impact of low ceilings. Meanwhile, Gifford (2002) highlighted the general effects of confined spaces on behavior, but did not provide design solutions that could be applied specifically to vertical dwellings. This research fills the gap by analyzing the unique comfort and behavioral challenges faced by residents of The Jarrrdin Apartment in Bandung, where the ceiling height is below the recommended standard. The aim of this research is to provide design recommendations that improve occupants' quality of life through improved air circulation, daylighting, and social interaction, while contributing to the development of more humane and sustainable vertical housing.

METHOD

Research Method

In this study, a qualitative method was employed through the following approaches:

1. Field Observation: Observing occupant behavior in the apartment lobby area, communal areas, and resident lift zones.
2. Interviews: Conducting interviews with residents and apartment staff to gain insights into the residents' experiences regarding unsupervised access to lift areas and their sense of security in communal spaces.
3. Design Analysis: Analyzing the existing design of the ground floor area that connects the lobby to the lift zone, and identifying deficiencies in surveillance and spatial arrangement.

Behavioral Mapping Research

The behavioral mapping technique was developed by Ittelson in the 1970s. This method utilizes sketches or diagrams of a specific area to record human activities as they occur. The purpose of this technique is to map behavior by identifying the type and frequency of activities and to relate these behaviors to specific design features within the environment.

Human Behavior Patterns in Residential Spaces

Human behavior patterns are strongly influenced by spatial design, including how residents interact with public and semi-public areas in vertical housing. According to Behavior Setting Theory (Roger Barker, 2012), the relationship between place and occupant activity is key to creating a sense of comfort. Spaces that are unsupervised or poorly structured can lead to feelings of insecurity and discomfort, which in turn affect behavior—such as avoiding the use of communal facilities or a decline in social interaction among residents.

In the context of apartment living, the design of public and semi-public spaces that supports natural surveillance and social interaction can help reduce negative behaviors and enhance the sense of safety and comfort. Behavior Setting Theory emphasizes that spatial arrangements that effectively connect space with activity can positively influence resident behavior and contribute to a healthier and safer environment. Therefore, careful attention to design elements that support social interaction, surveillance, and access control is essential in fostering positive behavioral patterns within apartment communities.

The Impact of Low Floor-to-Ceiling Height on Resident Comfort

Low floor-to-ceiling height in residential units can lead to several psychological and physical issues for occupants, such as a sense of confinement and inadequate ventilation. In addition, limited natural lighting can affect the atmosphere of the space, thereby reducing occupant comfort. According to Robert Gifford, low ceiling height may also influence residents' behavior patterns, as they tend to avoid certain activities in spaces that feel cramped.

RESULTS AND DISCUSSION

Based on the research findings, several key insights were identified regarding the low floor-to-ceiling design at The Jarrdin Apartment:

1. Limitations of Vertical Space Height

According to Ernst Neufert's Architects' Data, the minimum standard ceiling height commonly used for specific functions is outlined clearly. For residential spaces such as bedrooms and living rooms, the recommended minimum height is 2.4–2.5 meters, although higher ceilings are often considered more comfortable.

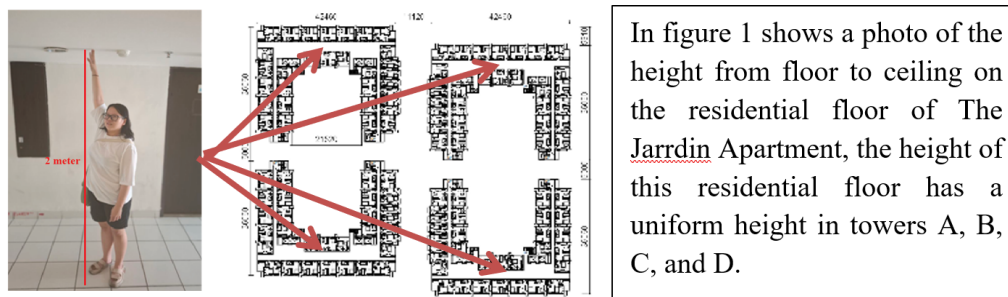


Figure 1. Ceiling Height Position in The Jarrdin Apartment

Source: 2024

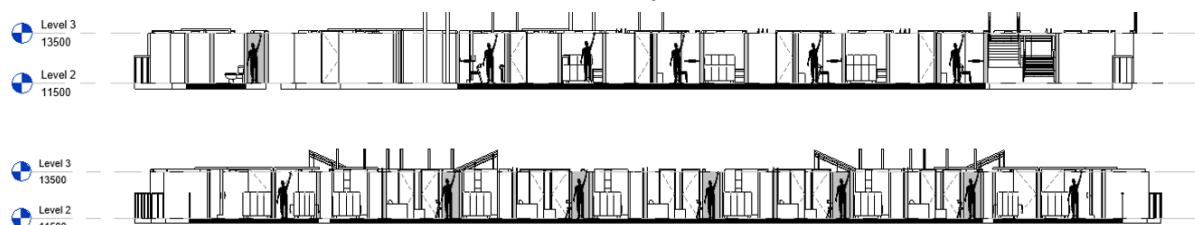


Figure 2. Section of Floor Height in The Jarrdin Apartment Residential Units

Source: 2024

At The Jarrdin Apartment, the ceiling height is only 2 meters, which is considered low. Residents living in units with low floor-to-ceiling heights have reported feelings of discomfort and pressure due to poor air circulation. This leads to a sense of unease that affects their daily activities. Many residents feel that the space is too restricted for comfortable movement.

2. Poor Lighting Quality

Low ceiling height limits the amount of natural light that can enter the unit, especially in units facing building sides that do not receive direct sunlight. Insufficient lighting negatively affects residents' health, including issues such as sleep disturbances and poor mood.

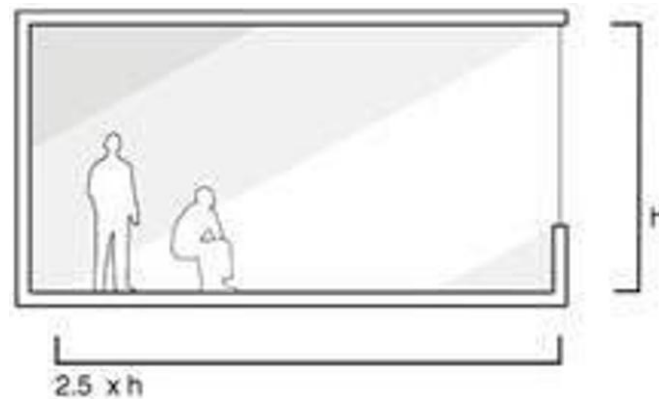


Figure 3. Natural Lighting

Source: Neufert

The comfortable depth of a room in relation to the position of sunlight is approximately 2.5 times the ceiling height. If the room extends beyond this ratio, it becomes uncomfortable because sunlight cannot effectively reach the areas beyond this comfortable depth, resulting in reduced natural lighting and a darker interior.

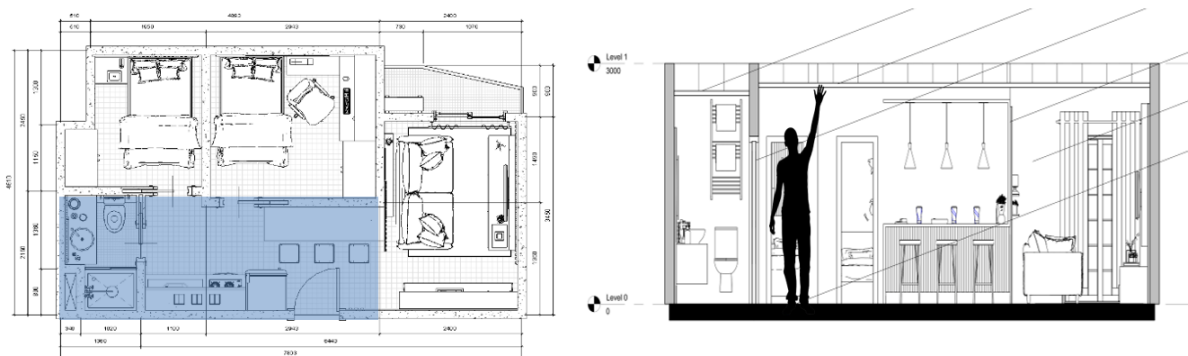


Figure 4. Existing Type 18 Floor Plan

Source: 2024

3. Limited Social Interaction

Cramped and uncomfortable spatial design affects residents' social interactions. Many occupants prefer spending time outside their apartment units to avoid feelings of confinement. This behavior reduces their sense of ownership over the space and diminishes the potential for forming social bonds with other residents.



Figure 5. Communal Space Atmosphere During the Day
Source: 2024

At The Jarrrdin Apartment, social interaction is highly limited due to the lack of dedicated spaces for residents to connect. The only area intended for socializing is the communal space located on the ground floor. This communal area primarily serves commercial functions, such as food stalls and a convenience store for daily necessities. There is no designated play area for children. As shown in Figure 5, the communal space was intended to facilitate social interaction, but in reality, it does not function effectively in that role.

4. Psychological Impact on Residents

The decline in physical comfort caused by low ceiling height has a direct impact on residents' mental health. Occupants often feel anxious and stressed, which affects their daily productivity. This behavior pattern leads to the avoidance of using spaces within the apartment unit.

Based on the survey analysis and findings from the case study of The Jarrrdin Apartment, the following are several alternative design recommendations that can be implemented to enhance resident comfort:

1) Increasing Floor-to-Ceiling Height

Increase the ceiling height of apartment units to a minimum of 2.4–2.5 meters, or higher if possible, to improve spatial volume and air circulation. This provides residents with more vertical space, which positively impacts comfort and overall quality of life.

2) Enhanced Multi-Level Social Interaction

By adding interaction spaces such as communal areas—either in the form of open spaces on each floor of the apartment towers or on the rooftop—social interaction among residents can be significantly improved.

Changes in floor-to-ceiling height will make the housing units more comfortable for daily activities, as residents will no longer experience feelings of anxiety and stress. Higher ceilings create a sense of openness and flexibility within the unit. This contributes to a more pleasant and inviting atmosphere, encouraging residents to feel at ease and spend more time inside their units rather than seeking more comfortable spaces elsewhere.

CONCLUSION

The implementation of alternative design strategies in The Jarrrdin Apartment in Bandung—particularly increasing the floor-to-ceiling height—can have a significant impact on residents' comfort. By designing more open spaces and improving natural lighting and ventilation, residents are likely to feel more at ease within their units. Additionally, these design changes can positively influence residents' behavioral patterns by creating environments that support social interaction and a sense of security. Therefore, even modest design improvements can greatly enhance residents' quality of life and contribute to a healthier and more comfortable living environment.

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